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Before the
Federal Communications Commission
Washington, D.C. 20554

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In the Matter of)

Advanced Television Systems)
and Their Impact Upon the)
Existing Television Broadcast)
Service)

MM Docket No. 87-268

**REPLY COMMENTS OF THE
ASSOCIATION OF LOCAL TELEVISION STATIONS
ON THE FIFTH NOTICE OF PROPOSED RULEMAKING**

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August 12, 1996

File of Originals rec'd 029
LIT-11-11-96

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Executive Summary

The FCC should enact the complete ATSC DTV standard, including all HDTV and SDTV formats, as soon as possible. This is the most advanced terrestrial digital television system on the planet. It has undergone years of development and testing. The standard was developed through an open, government sponsored process that included the computer, cable and motion picture industries. Last minute calls to abandon the government standards process should be seen for what they are – an attempt to use the political process to gain marketplace advantages. Similarly, the computer industry's attempt to radically alter the standard should be rejected. These issues were fully explored during the eight year standard setting process. The Commission should not lose sight of its primary goal – to bring the benefits of free, over-the-air digital television to the American people as rapidly as possible.

The ATSC DTV standard is critical to the rapid deployment of digital broadcast television. Absent a standard, private capital markets will not invest in new, digital broadcast technology. Local stations will not invest in new digital facilities and equipment. The consumer electronics industry will not manufacture digital receivers. By not setting a standard, the Commission will be repeating the mistake it made with AM radio.

Reality should take precedence over abstract theories. There is no evidence that private markets, acting alone, will select a system that is superior to the system now before the Commission. To the contrary, without a government standard broadcast television technology may be frozen in an analog world. The benefits of improved service, greater spectrum efficiency and international trade opportunities will be lost if the ATSC DTV standard is not adopted.

The computer industry's concerns are unfounded. The Commission is being asked to adopt a broadcast **transmission** standard. The computer industry's complaints are based on perceived problems associated with **display** formats. The ATSC DTV standard would not force computer interests to change their current progressive scan displays. They could continue to manufacture and market these displays for the new PC/TV receivers. In any event, the transmission standard is interoperable with computer technology. Features such as progressive scanning, MPEG-2, square pixels have all been incorporated into the system. To the extent the computer industry wants to enter the PC/TV market, it can manufacture receivers that readily decode ATSC DTV transmissions and display them in a progressive scan format.

The FCC should reject the computer industry's attempt to ban all interlaced digital transmissions. Interlaced transmission may be vitally important for the broadcast of live action HDTV programs such as sporting events. HDTV quality sports programming will be a driving force behind the purchase of new digital television sets. Also, the 16:9 aspect ratio should be retained. While a 2:1 aspect ratio would benefit roughly 20 percent of the films produced, it would impair the viewing of 80 percent of the films that are produced and all other television programs. Finally, these radical alterations to the ATSC DTV standard would require new engineering and testing. It will delay implementation of digital broadcast television for years.

To further ensure the rapid deployment of digital television, set manufacturers should be required to make television sets that are capable of receiving and decoding all of the ATSC DTV formats. Consumers should be able to access HDTV and SDTV formats on all television sets.

Cable systems have a significant opportunity to frustrate the deployment of digital broadcast television. The cable industry's recent opposition to the ATSC DTV standard demonstrates that it wants to control the digital gateway through the set top box. The ATSC DTV standard should be applied to cable television and other multichannel providers. The ATSC DTV standard was developed to be fully compatible with cable systems. Unless the

standard is applied to cable and other multichannel providers, consumers would be forced to needlessly purchase numerous converter boxes to access broadcast programming.

Finally, both Congress and the FCC have expressed a strong desire to reclaim unused television spectrum and repack the television band. By not adopting the ATSC DTV standard, the transition to digital will be delayed for years, perhaps decades. As a result, the government will be unable to reclaim and repack spectrum. Adopting the ATSC DTV standard will expedite the process.

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The Association of Local Television Stations (ALTV) represents local broadcast television stations across the United States. Our membership includes local television stations affiliated with the emerging Fox, UPN and WB networks as well as traditional independent television stations. ALTV has been actively involved in this proceeding, supporting the comments filed by the television broadcast industry.¹ The Broadcasters' Comments reflect the position of a cross section of the television broadcast industry and its major trade associations. ALTV writes separately to address specific issues raised by those parties opposing the enactment of a digital broadcast standard.

ALTV urges the Commission to pursue consistent policies that will expedite the deployment of free, over-the-air digital television service. The fundamental objective of this proceeding is to bring high quality digital signals to the American public. Much of the debate has centered on issues other than deploying the best possible digital system as rapidly as possible. The computer interests do not want existing television set manufacturers to gain an

¹See Broadcasters' Comments on the Fifth Notice of Proposed Rulemaking, MM docket No. 87-268, filed July 11, 1996. (hereinafter "Broadcasters' Comments")

advantage in producing the next generation of interoperable PC/TV receivers. The cable industry does not want the broadcast DTV standard to gain an advantage over their digital set-top boxes. The cinematographers want the world to see their movies on a wide screen. These issues should be of secondary importance. The FCC's primary goal should be the rapid deployment of free, over-the-air digital broadcast television. The Grand Alliance DTV system is ready to go. Any departure from the present course, such as failing to adopt the ATSC DTV standard or making significant changes in that standard, imperils rapid deployment.

I. THE FCC SHOULD ADOPT THE ATSC DTV TRANSMISSION STANDARD IN ITS ENTIRETY.

The FCC should adopt the ATSC DTV standard, in its entirety, as soon as possible. This standard is the most advanced television standard in the world. It has been subjected to over eight years of testing with full government support. It was an open process which included participants from both the cable and computer industries. Because of the government's encouragement, a consensus was reached. Indeed, the HDTV standard was approved by an overwhelming forty-two to two vote (with six abstentions). Revisions to the standard, to include SDTV formats, also received near unanimous approval by a forty-three to one vote (with six abstentions). In 1995, the White House-sponsored Advanced Digital Video National Information Infrastructure Workshop recommended adoption of a terrestrial broadcast digital transmission system based on the Grand Alliance system, noting the significant contributions the system would make to this nation's information infrastructure. This recommendation was approved by the Administration's full Information Infrastructure Task Force in January 1995. The government-established Advisory Committee presented the system to the FCC over six months ago. Given these overwhelming endorsements, the Commission was quite correct in placing the burden of persuasion on those parties wishing to derail the process at the eleventh hour.

A. Examine The Motives

Both the computer and cable industry comments oppose the adoption of a standard. While the computer companies argue against any government standard, they appear perfectly willing to accept a government standard, provided it is *their* standard. Despite the fact that the computer industry's issues were debated at length during the eight year Advisory Committee process, they want to discard these efforts and, at the last minute, reverse direction. The computer industry's "concerns" are nothing more than an attempt to secure a position in the PC/TV equipment market. Computer interests want to limit a local television station's transmission options in order to manipulate the consumer equipment market. They do not want to see television sets manufactured that have superior technical abilities to decode a variety of digital formats. Instead, they want consumer equipment to be "dumbed down" so that it more closely resembles existing computer monitors. This way they can keep existing television set manufacturers from gaining an "advantage" in the marketing of new equipment. This is nothing more than an attempt to use politics to circumvent the engineering and standard setting process established by the Commission.

The cable industry takes the "purist" approach, arguing on a theoretical level that the government should not impose government standards.² Their motives, however, are far from pure. As a recent editorial in *Broadcasting and Cable* noted:

The U.S. Cable industry, a day late and a dollar short, has come out against adoption of a federal standard for digital television. Its a decision as transparent as it is limp, and it will persuade no one at all that the ATV momentum it's taken eight years to generate should now be diffused...

Our disappointment is that NCTA has reverted to typical protectionist behavior -- in this case, seeking to control the gateway to the set-top box.³

Both computer and cable interests posit several theoretical arguments to support their position. None of them are persuasive.

²See Comments of the National Cable Television Association, Inc. at 2. (hereinafter "NCTA")

³*Broadcasting and Cable*, July 15, 1996 at 82.

B. Failure To Adopt A Standard Will Destroy ATV Implementation

The first criticism of federal government standard setting is that the process takes too long. Assuming this argument has any merit, which it does not, it would be more applicable to the beginning of the standard setting process. It is completely irrelevant to the enactment of the present DTV standard. We are now at the end of an extensive research and testing process.

The failure to adopt the standard will delay, if not altogether destroy, the deployment of this technology to the American people. It would send a devastating signal to private capital markets that the government no longer endorses a digital system for over-the-air digital television. The investment needed to deploy digital broadcast television will evaporate. It will send the engineers back to the drawing boards as competing interests attempt to modify the system to fit their own purposes. Re-engineering and testing could take years. The industry is ready to move forward – now! This will not happen without a government standard.

C. Standard Setting And Technological Improvement: Theory vs. Reality

Both the cable and computer industry assert that government standards have the effect of freezing technology. This is not the case with the Grand Alliance ATV system.

The Grand Alliance system has incorporated significant headroom to accommodate technological advances. This is not a rigid, inflexible system and the adoption of a standard would not "freeze" technology. To the contrary, both commenting parties and the FCC's *Notice* acknowledge the system's flexibility.⁴ It provides sufficient flexibility to accommodate supplemental standards that build on the basic digital standard.⁵ There is ample room to accommodate new technological developments.

The key point here is that the theoretical analyses of standard setting presented by the

⁴See Broadcasters' Comments at 6.

⁵See Comments of the Advanced Television Systems Committee at 10.

cable and computer industries do not necessarily involve a standard which has the degree of flexibility achieved by the current ATSC DTV standard. As a result, many of the theoretical economic analyses are not applicable to the instant case.

Even in terms of economic theory, it is far from clear whether the absence of a government standard would result in a superior advanced digital television system for the American people. Market forces, by themselves do not necessarily lead to the optimum choice of technology. Bruce Owen's survey of the relevant economic literature explains:

Economic analysis of standards has tended to focus on whether the market's choice of a standard will be optimal. Some theoretical economic work has suggested that noncooperative decision making in the presence of network effects may sometime result in a socially incorrect choice among new technologies. These models demonstrate that the reasons for presuming that competitive market outcomes (such as prices) are efficient do not necessarily apply to technology choice problems, especially those with network effects.⁶

Mr. Owen's statement refers to economic studies indicating that a pure market approach may simply favor those technologies with a larger user base as opposed to the best technology. He observed:

There is no necessary assurance that the market will tip in the direction of the most socially beneficial technology, or that having done so the resulting standard will produce a non-optimal future development path for technology.⁷

Moreover, the lack of a government sponsored standard may preclude a standard from ever being adopted. His review noted:

Alternatively, other theoretical models of technological competition predict that in some cases no standard will be adopted....

The potentially paralyzing fear of being first when the supply of complementary components is uncertain is known as the "chicken-and-egg" problem.⁸

At least in theory, there is no guarantee that the market will select a technology that maximizes social benefits.

⁶See Comments of NCTA, Attachment A, Declaration of Bruce M. Owen at 5.

⁷*Id.* at 6.

⁸*Id.* at 6

[D]epending on factors that are difficult or impossible to measure, the market may either tend to stay with an obsolete standard when it may be socially desirable to change standards ("excess inertia") or tend to switch to a new standard when it may be socially desirable to stay with an established standard ("excess momentum"). *In sum, the competition among technologies will not always result in the selection of the technology that maximizes social benefits.*⁹

Mr. Owen notes that "some authors have argued that when there are 'network' effects, it may be wise to have a central authority pick a single technology."¹⁰ Network effects are clearly present in the television broadcast industry. The value of digital television will certainly increase as more and more consumers use the technology. Because consumers do not pay directly for free, over-the-air television, increases in the digital audience will make it more economical to produce programs for digital television and also serve to drive down the costs of consumer equipment.

Mr. Owen argues that given the consensus surrounding the ATSC DTV standard, there is no need for a government mandate. Presumably, the parties that have agreed to the Grand Alliance system would continue to do so absent government involvement. This argument ignores the underlying motives for the consensus. Government encouragement and the belief that a standard would be adopted by the FCC were critical factors in creating this consensus. Absent government involvement, it is quite possible that the marketplace would not have devoted the resources to reaching a consensus. Indeed, the cable industry's last minute decision to oppose the standard provides some evidence that absent FCC encouragement, a standard may not be developed.

Of course, as NCTA's economic consultant, Mr. Owen goes on to argue against adopting the ATSC DTV standard.¹¹ Nonetheless, his own review of the economic literature suggests

⁹*Id.* at 7

¹⁰*Id.*

¹¹Perhaps the most telling aspect of Mr. Owen's analysis is his statement that the parameters imposed on the ATSC DTV process, such as operating within terrestrial broadcast spectrum slots, may not be consistent with an "optimal" DTV system. *Owen's Declaration* at 12. He states further that, "Relaxing this constraint (or others) may have yielded a very different standard that would better serve the public interest. *Id.* It is plain from this statement that the cable industry's primary purpose in this proceeding is to prevent the deployment of free, over-the-air digital

that the marketplace may not select the "best" technology. It certainly does not support the notion that the marketplace will always select a better system than the government. To the contrary, government standards may be more socially beneficial because they can stimulate competition.

Theory aside, the Commission must deal in the real world. Noticeably absent from Mr. Owen's declaration is any consideration of the real world example of AM stereo. In that case, the FCC's decision not to adopt a standard doomed the technology. This occurred, even though at the time, the Motorola C-Quam system had gained far more acceptance than the competing Kahn system. Absent a government standard, the radio industry and receiver manufactures were confronted with a classic "chicken and egg" problem. Radio stations had no control over the equipment market for AM stereo receivers and radio manufactures had no control over radio transmission systems. Without government coordination through the standard setting process, paralysis ensued. Stations were afraid to select a transmission system unless they knew radios would be capable of receiving the "correct" AM stereo signal. Radio manufacturers were unable to market radios without knowing the transmission system. The failure to establish a standard froze AM technology and prevented the deployment of AM stereo.¹² Thus, left on its own, the radio marketplace not only failed to select the most optimum AM stereo technology, it froze AM technology in place. If the FCC is not careful, it may be repeating this mistake with digital television.

The computer industry cites to the explosion in personal computers as an example of why the FCC should not enact an ATV standard. The example is irrelevant to a broadcast ATV standard. The personal computer is basically a self contained, closed system. Each computer

television that will compete with cable. Such a result would enhance their ability to control access to digital signals through a set-top box.

¹²Compare this result to FM and TV stereo, where the FCC did establish a standard. These technological improvements were readily accepted by consumers. In this regard, the computer industry's assertions that consumers simply did not want AM stereo make little sense. AM and FM radio are largely interchangeable services. There is no reason to believe that consumers would demand stereo service in the FM band but not demand similar quality AM service.

company has control over its own software and hardware. If you purchase an IBM compatible system with Microsoft software it will work. It does not matter that your next door neighbor is using an incompatible Apple computer. The battle between video cassette recorder systems, VHS vs. Beta, provides another example.

The same analysis holds true for new PCS systems. The fact that PCS technology is incompatible with traditional cellular telephones does not matter. For example, the Sprint Spectrum system in Washington works because Sprint controls the transmission technology as well as the telephone equipment that will be used on the system.

Services such as DBS and MMDS are point to multi-point subscription based systems and cannot be compared to free over-the-air broadcasting. They are essentially closed systems controlling both the transmissions and receiving equipment (set-top boxes). Subscribers purchase the necessary equipment, *i.e.* back yard dishes and microwave antennas, to receive signals. More importantly, as subscription services, DBS and MMDS are not solely dependent on advertising revenues. Their economic survival is not a function providing universal service to every consumer in a market.¹³ To the contrary, as pay services, they are able to compete successfully even though they reach a smaller segment of the marketplace.¹⁴

Unlike closed, subscription services, broadcasters have no control over reception devices used by their viewers. Like the radio stations during the AM stereo debate, local television stations must rely on the fact that once the signal is sent, consumers will have the necessary

¹³As a national service, DBS systems do not have to reach every person in all broadcast markets. It is able to compete by reaching relatively few viewers in each locality which, in aggregate, provide a sufficient subscriber base to create a national service.

¹⁴For example, cable systems flourish even though roughly 35 percent of consumers do not subscribe. The subscription revenues derived from the 65 percent that do subscribe are more than adequate to create a competitive service. MMDS will operate in much the same fashion. A local television station could not survive as a free service if, through technological incompatibility, it lost access to 35 percent of the audience. In fact, a loss of even 10 percent of the audience would drive many stations out of business.

equipment to receive the signal.¹⁵ For digital television to be successfully deployed, there must be coordination between the broadcaster who sends the signal and the consumer who purchases the equipment. Moreover, investors and equipment manufacturers must feel secure that the system will work before they will act. This "open" system simply cannot be compared to "closed" systems.¹⁶

Significantly, the economics of local, free over-the-air television are completely different from "closed" subscription based systems. A station's sole source of revenue is advertising. There are no subscription fees. For the system to survive as a *free* service, it must have universal access to all consumers. Losing even small portions the audience drives advertisers away and imperils the economic viability of a local station. Absent a standard, there will be no coordination between a station, set manufactures and consumers. Different transmitting and receiving technologies could mean that significant portions of the audience would be unable to receive a station's signal (without the purchasing multiple receiving devices). At this point free television loses its universality. To survive, local stations would have to shift operations away from a free, universal service. In the end, broadcasting could become nothing more than a closed narrowly targeted subscription service similar to MMDS. The lack of universal access to the audience, which can only be achieved through a government established digital standard, is therefore critical to the viability of free, over-the-air digital television.

The *Notice* was absolutely correct to differentiate between closed system subscription

¹⁵The problem becomes more complex at the regional and national levels. Over-the-air television signals broadcast from different markets often overlap. What would happen to consumers in Maryland if the Washington and Baltimore television stations used a different digital transmission system? A television set that works in Baltimore may not work in Washington. Television sets purchased in Boston may not work in San Francisco. Imagine what would happen if the battle between Apple and IBM/Microsoft was played out in the broadcast industry. Do you purchase an Apple TV or an IBM TV? Are all the television stations in your market using the Apple broadcast transmission system or the IBM TV transmission system? If they are not using the same transmission system, will you be forced to purchase additional set top boxes to watch all your favorite television stations? The complexity and additional consumer costs imposed by such a system are staggering. In reality, the result is that free over-the-air digital technology would not be deployed.

¹⁶See Broadcasters' Comments at 15 -20.

services and universally available free, over-the-air digital television. Commissioner Susan Ness said it best in her separate statement.

There is theory and there is reality. In real life investment decisions have to be made. Broadcasters must decide whether to invest billion of dollars in new equipment without new revenue streams to cover capital costs and without assurance that their audiences will follow....

The adoption of a single standard would result in the manufacture and purchase of a large volume of digital television receivers, leading to lower costs and a rapid decrease in prices.¹⁷

C. International Trade: The Window Of Opportunity Is Closing

In the late 1980's, Japan's narrow muse, analog HTDV system was gaining prominence in the United States. The government encouraged the private sector to meet the challenge. It did! The Grand Alliance System leapfrogged over the Japanese analog HDTV system, creating a far more advanced digital television system. At this point in time we are winning the technological race with American technology. The race, however, is not over.

Adoption of a standard will have both immediate and long term benefits to the American economy. Today, there are over 30,000 U.S. workers directly involved in the manufacture of consumer TV receivers an related devices.¹⁸ Two of the leading television set manufacturers, Thompson Consumer Electronics and Phillips Electronics North America Corporation, have publicly committed to building HDTV receivers in the United States.¹⁹ There are literally billions of dollars in economic growth at stake, not only in receiver manufacturing, but also in rebuilding over 1600 television stations and upgrading all the equipment necessary to run these stations. All the benefits of being a technological leader in the world market are ready to flow into the Untied States. The benefits to our international trade posture are enormous

Unfortunately, we are not alone. The Europeans have already adopted an incompatible

¹⁷Separate Statement of the Honorable Susan Ness, *Fourth Notice of Proposed Rulemaking and Third Further Notice of Inquiry*, MM Docket No. 87-268 (August 9, 1995).

¹⁸See Comments of Citizens for HDTV at 16.

¹⁹*Id.* at 17.

digital standard (DVB). At stake are the markets of North and South America as well as Asia.²⁰ The DVB system is not as advanced as the Grand Alliance system and is not computer friendly.²¹ The DVB system provides only SDTV quality formats, uses interlace scanning and non-square pixels exclusively.²² Therefore, it is ironic that the computer industry would decry the Grand Alliance system, which is primarily a progressive scan system using square pixels, when the leading competitive alternative is a European system that is far less compatible with computers.²³

D. Spectrum Efficiency

All agree that digital television is far more efficient than the current analog transmission system. After the transition to digital television is complete, it may be possible for the government to repack the television band and reclaim 138 megahertz of spectrum. The possibility of reallocating spectrum for other purposes and the potential auction revenues that could be obtained has been a top priority for Chairman Reed Hundt. The government's spectrum recovery plans, however, depend on the ability of television broadcasters to transition from analog to digital transmissions. It makes little sense, therefore, for the government to further delay the transition by not adopting a digital television standard. On the contrary, adopting the ATSC DTV standard will expedite the deployment of digital television and hasten the day when the government will be able to reclaim spectrum.

²⁰See Comments of General Instrument Corporation at 8-11; On this point the Canadian broadcasters are urging the FCC to adopt the ATSC DTV standard. See Comments of Canadian TV Broadcasters at 2.

²¹Comments of Matsushita Electric Corporation of America at 5.

²²Comments of the Advanced Television Systems Committee at 31.

²³See text, *infra*, for a discussion of the computer industry's technical complaints.

II. SPECIFIC, TECHNICAL CRITICISMS OF THE ATSC DTV STANDARD ARE UNFOUNDED

The computer industry and a small segment of the motion picture industry (cinematographers) level several technical criticisms against the ATSC standard. Before turning to specific issues we offer the following observations.

First, the Commission must remember that the standard, while extremely flexible, is primarily designed to meet the needs of television viewers. The convergence of televisions and personal computers is an important component of this debate. Nonetheless, the needs of television viewers should not be sacrificed in order to transform a television set into a desk top computer monitor. A computer display is designed to be "read," usually at a viewing distance of less than two feet. A television display is designed to view moving images at a typical distance of seven to ten feet.²⁴ The demands of television viewers should not be lost on the road to convergence.

Second, there is no doubt that the system is sufficiently interoperable with computers.

The system's all digital layered architecture, its packetized data transport structure, its use of headers and descriptors, its support of multiple picture formats and frame rates with a heavy emphasis on progressive scan and square pixels, and its compliance with MPEG-2 international compression and transport standards, give it unprecedented and unmatched interoperability with computers and telecommunications.²⁵

Third, the entire debate over the technical flaws of the ATSC DTV standard is somewhat puzzling. WebTV Network just announced it will market set top boxes that will enable consumers to access the Internet on their existing analog television sets.²⁶ Set top boxes would be priced "well under \$500."²⁷ If this system can work on an analog, interlaced television set

²⁴See Comments of Tektronix, Inc. Appendix A, Peter D. Symes, "A Commentary on Some Aspects of Interoperation, at 2-3.

²⁵See Comments of the Digital HDTV Grand Alliance at 17-18.

²⁶*Broadcasting and Cable*, July 15, 1996 at 52.

²⁷*Id.*

with round, not square pixels, there is no reason to believe that the ATSC DTV standard will not be fully interoperable with computers. Also, Compaq and Thompson Consumer Electronics announced the development of a TV/PC project proving that an NTSC analog transmission displayed on an analog interlace television set is not an insurmountable problem for computer applications.²⁸ Microsoft and DirectTV intend to cooperate to deliver computer content over DirectTV's interlaced digital DBS system.²⁹ Because existing television sets will be used, this means that an interlaced television set will be used to display these computer images. If computer applications can work on existing analog, interlaced television sets (with non square pixels), then there should be no problem with computer applications on digital sets even if interlace transmissions are used.

Finally, the FCC should not lose sight of the fact that this is a broadcast **transmission** standard. It is not a **display** standard. The computer industry is attempting to limit the transmission choices of American television stations. Nothing in this proceeding, however, prohibits the computer industry from producing progressive scan computer/TV **displays** for home or office use. The advent of digital television means that material **transmitted** using the lone interlaced HDTV format may be **displayed** in a progressive format.

A. Interlaced Scanning

The computer industry acknowledges that the ATSC DTV Standard is largely a progressive scan system. Five of the six HDTV formats employ progressive scan formats.³⁰ Nine of the twelve SDTV formats in the ATSC DTV Standard use progressive scanning.³¹ Despite these progressive scan formats, the computer industry does not want broadcasters to have the option to transmit digital signals using interlace at all. They want to ban the technology. In short,

²⁸Comments of the Digital HDTV Grand Alliance at 21 n.22

²⁹*Id.*

³⁰See Comments of the Digital HDTV Grand Alliance at 19.

³¹*Id.* at 20

computer interests want to limit the flexibility of the system to an all progressive scan transmission mode.³²

Retaining the option to transmit digital interlaced signals may be vitally important for local television stations.³³ ALTV members are the predominant suppliers of live local sporting events for free to the American public. For example, many independent and emerging network stations broadcast local, regular season major league baseball games. The same holds true for local NBA, NHL and local college football broadcasts. Retaining an interlace option could be vitally important to providing superior coverage of these games.

Banning the one interlaced HDTV format could dramatically reduce the quality of HDTV live action sports programs. Given today's technology, the only progressive scan format for HDTV live video would be a 720 line resolution format. Many in the industry believe, however, that to transmit a high definition format they must have more than 1000 lines of resolution to be successful.³⁴ Significantly, interlace may be essential to transmit HDTV within the confines of a six Mhz channel.

It is important that the Commission note that no party advocating the total removal of the interlace mode from the ATSC DTV standard has offered any technical comments whatever on how the high spacial resolution 60 Hz 1920 x 1080 HDTV signal is to be transmitted through the 6 MHz broadcast channel. In the context of today's BEST compression technology, it simply cannot be done other than in the interlace mode.³⁵

³²According to the computer industry, progressive scanning has superior vertical resolution, making it easier to read text and graphic displays. It fears that broadcasters will continue to use interlace which is better for capturing fast motion. Interlace may not be as good for reading text and graphics up close because of a "flicker" in the display. While this would be a problem for consumers using their television sets as work stations, the real question is whether this is how the TV/PC will be used. Today television news programs regularly use graphics with no apparent problem. Also, even if a program is transmitted in interlace, the television set can decode the signal and place it on a progressive scan display.

³³All material produced on film and approximately 80 percent of today's prime time television programming can be transmitted using progressive scan formats. See Comments of the Digital HDTV Grand Alliance at 19. Interlace, however, could be extremely important of live action sports programs.

³⁴Comments of the Digital HDTV Grand Alliance at 22.

³⁵See Comments of SONY Electronics Inc. at 18.

In testimony before the United States Senate, the computer industry's witness acknowledged the problem, but offered no solutions. While arguing for an all progressive DTV system, the witness stated:

Progressive display is the preferred method of doing it. There are still some problems with doing that with HDTV and keeping up with fast action such as sports, but I suspect those can be solved fairly readily.³⁶

From a production standpoint, interlace may offer significant advantages for live, remote HDTV camera shots. Current interlace HDTV cameras provide the benefit of a 1 1/2 F-Stop advantage.³⁷ This could be significant for broadcasting live sporting events and remote "on the scene" broadcasts, especially at night.³⁸

Over time, it may be possible for progressive scan transmissions to accommodate fast action movements. At that point an all progressive scan transmission system may be appropriate. In fact, the Advisory Committee on Advanced Television supported the migration of the interlaced format to a progressive format.³⁹ Until that time, however, it would be a serious mistake to ban interlace formats. One of the key forces driving the deployment of digital television will be the superior picture quality associated with HDTV. The advantages of this will be most apparent in the coverage of live action sports. Banning interlaced formats could eliminate one of the primary reasons why consumers would purchase digital television sets.

B. Aspect Ratio

The ATSC DTV standard employs a 16:9 aspect ratio. The decision to use this aspect ratio was the result of years of debate. One segment of the Hollywood community, the

³⁶Testimony of the Hon. Vernon J. Ehlers before the Committee on Commerce Science and Transportation of the United States Senate, June 20, 1996 at 30, cited in CICATS Comments, Appendix O.

³⁷See Comments of SONY Electronics Inc. at 18.

³⁸MIT Lab's William Schreiber argues that this is no longer an issue given the development of the Polaroid/MIT progressive scan HDTV camera. See Comments of William Schreiber at 4. From an economic standpoint, however, it would seem to make sense to create an environment in which both types of HDTV cameras compete.

³⁹See Broadcasters' Comments at 11.

cinematographers, oppose this standard, preferring a 2:1 aspect ratio for receivers.⁴⁰ They are concerned that the 16:9 aspect ratio will prevent the display of wide screen feature films.⁴¹ The FCC should reject this last minute call to change a fundamental element of the ATSC DTV standard.

The decision to use the 16:9 aspect ratio was made over a decade ago. The motion picture industry participated extensively in this debate.⁴² This aspect ratio has been supported by the Society of Motion Picture and Television Engineers (SMPTE) as the format best designed to deliver a wide range of TV programming and the vast majority of films.⁴³ The 16:9 aspect ratio for HDTV has been adopted by the European Telecommunications Union as well as Japan.⁴⁴ More recently the Motion Picture Association of America endorsed the proposal.⁴⁵

The reason is simple. Roughly 20 percent of all films use the unusually wide screen format that would be better accommodated by a 2:1 aspect ratio. Even for these films, a 16:9 aspect ratio means that wide screen films would occupy 100 percent of the screen's width and 76 percent of the screen's height. Changing the system to a 2:1 aspect ratio would increase picture size by only 5.3 percent.⁴⁶

While adopting the 2:1 aspect ratio would marginally increase the quality for 20 percent of the films produced, it would be far worse for the remaining 80 percent. With a 16:9 aspect ratio, these films would occupy 100 percent of the screens width and 96 percent of the height. Shifting to a 2:1 aspect ratio would reduce picture size for these films by 9.9 percent. The result would be even more dramatic for the volumes of television material produced with a 4:3 aspect

⁴⁰See Comments of the Coalition of Film Makers at 4.

⁴¹*Id* at 3.

⁴²See Comments of the Digital HDTV Grand Alliance at 25; Broadcaster's Comments at 11.

⁴³See Broadcasters' Comments at 12.

⁴⁴See Broadcasters' Comments at 13.

⁴⁵See Comments of the Motion Picture Association of America at 3.

⁴⁶See Broadcasters' Comments at 12; MPAA Comments at 3-4.

ratio. Picture size for these shows would be reduced by 16.8 percent.⁴⁷

Finally, adopting a 2:1 aspect ratio would increase the size of the television display area by 12.5 percent. The weight of the set could increase by 30 to 50 percent.⁴⁸ Even the cinematographers acknowledge that their proposal will increase the costs of television sets.⁴⁹ Significantly, these costs are not "software" costs which rapidly diminish over time.

C. Interoperability And Consumer Costs

The problems cited by the computer interests do not mean that the ATSC DTV standard is technically incompatible with computers. CICATS does not contend that computers cannot perform the functions necessary to accommodate these issues.⁵⁰ For CICATS, the issue is the cost of building computer monitors that are capable of encoding broadcast signals transmitted pursuant to the ATSC DTV standard. In an attempt to get a "leg up" on traditional television set manufactures, they want to limit a broadcaster's transmission options. Their arguments are cleverly couched in terms of reducing the costs for television receivers and set top boxes. The Commission should not accept such a transparent position.

First, the computer industry's concern about the inclusion of optional interlaced formats is grounded on the belief that the broadcast industry will continue to use type of transmission format.⁵¹ They contend further that it will be more expensive to build interoperable TV/computers because of the additional electronics needed in the receivers to decode both interlace and progressive scan transmissions.

This argument is completely inconsistent with the computer industry's preferred position

⁴⁷See Comments of MPAA at 4.

⁴⁸See Broadcasters' Comments at 13.

⁴⁹See Comments of the Coalition of Film Makers at 4 n.4

⁵⁰See Comments of the Computer Industry Coalition On Advance Television Service at 27. (herinafter CICATS)

⁵¹At least one broadcast company, ABC, has announced that it intends to use a progressive scan format.

– no standards at all. If their assumptions about broadcasters are correct, then local stations will broadcast in an interlace digital format. In fact, without a standard broadcasters are likely to remain as an analog service because digital television may never be deployed. As a result, PC/TVs would become even more expensive because they would have to decode numerous digital interlace and progressive scan transmissions as well as traditional analog signals. As a result, the computer industry and consumers would be placed in a more disadvantageous position than they would be if the FCC adopted the ATSC DTV standard. Therefore, if the FCC accepts the computer industry's receiver costs argument, then it must adopt a digital broadcast standard.

Second, nothing in this proceeding would require the computer industry to build interlaced or for that matter progressive scan PC displays. Again, this is a broadcast *transmission* standard. The computer industry could continue to build and sell work station monitors and PCs according to whatever specifications they like. The need to incorporate the necessary decoding functions would apply only if they intended to market receivers that would be used as traditional television sets as well as for computer applications. Even for these new PC/TVs, the computer industry could still use progressive scan displays.

Finally, the computer industry appears to have exaggerated the cost of receivers and set top boxes capable of receiving signals broadcast pursuant to the ATSC DTV standard. The computer industry's statistics are based on a brief analysis conducted by Mr. Steven Gabriel from Microsoft.⁵² The analysis attempts to establish a price differential between receiving equipment built pursuant to the CICATS's digital television standard and equipment built to meet ATSC DTV specifications. Mr. Gabriel asserts that, in aggregate, the ATSC DTV set top boxes and television sets will cost consumers billions of dollars more than receivers built to CICATS's standard.

⁵²Gabriel, Stephen, "Cost Comparison of ACATS and CICATS's Set-top Converters, Receivers and PC Decoders," cited in CICATS Comments, Exhibit C. CICAT'S additional economic analysis relies on Mr. Gabriel's cost comparisons. See Selwyn, Lee. "Economic Considerations in the Evaluation of Alternative Digital Television Proposals," cited in CICAT Comments at Exhibit D.

Mr. Gabriel assumes that receivers meeting CICATS's standard would be similar in cost to existing DBS set top boxes. (Existing DBS set top boxes take a digital satellite signal and convert it to analog for reception on an existing television sets.) This may be far different from the computer-compatible set top boxes envisioned by CICATS. There is no breakdown of the costs of component parts between current DBS set top boxes and the type of set top box envisioned by CICATS.

Also, the analysis simply assumes that the cost of a set top box or television receiver will be five times the price of a DBS converter box. This assumption is based on the fact that an MPEG-2 HDTV decoder needs five times more memory to process data at faster rates.⁵³ Even if this assumption is correct, there is no detailed analysis explaining why the ACATS system will cost five times more than the CICATS baseline system. There is no pricing breakdown of component parts to substantiate this assumption. Thus, the most fundamental element of the analysis, comparing price differentials between the two systems, does not appear to be based on hard data.

Third, the analysis completely ignores consumer demand for HDTV. According to CICATS, its standard would establish a baseline digital system in which all receivers would be able to receive digital signals, both HDTV and SDTV. Under its baseline system, however, enhanced quality signals like HDTV would not be displayed in an HDTV format.⁵⁴ The picture could be seen, but it would be converted to a lesser quality, SDTV-like picture.

The analysis compares apples and oranges. It never examines the additional costs associated with the CICATS system where consumers want to view high quality HDTV programs in an HDTV, not SDTV format. The approach taken is like comparing the price of a baseline

⁵³Of course the CICATS proposal also uses MPEG-2. While it may not be necessary in the baseline unit, CICATS seems to indicate MPEG-2 will have to be employed under its standard in order for set top boxes and television receivers to display enhanced quality HDTV type pictures. Without this "add on" all television signals, including those broadcast in HDTV, would be displayed on the baseline CICATS unit in a lesser quality SDTV format. See CICATS Comments at 33.

⁵⁴In fact it appears that the progressive scan approach would not accommodate the over 1000 lines of resolution necessary for true HDTV transmission.

Ford Taurus to a Cadillac and assuming that because the price of the Ford is lower, consumers will save billions of dollars. If the vast majority of the public wants the Cadillac, however, the question should be how much will it cost to convert the Ford into the Cadillac. This issue is never examined. To the extent HDTV becomes extremely popular, which we believe it will, the additional costs to make the CICATS system display enhanced video HDTV type signals could make the aggregate consumer costs much higher than the ACATS system.

Finally, there is no indication that the analysis takes into consideration recent developments regarding the pricing of decoding technology. The Grand Alliance prototype system demonstrated that de-interlacer performance was transparent and the Advisory Committee concluded that concern over costs was unwarranted.⁵⁵ Moreover, on June 25, 1996, Lucent Technologies and Mitsubishi announced an agreement to develop chips including a display processor which transforms decoded video signals into various display formats.⁵⁶

III. RECEIVERS SHOULD BE SUBJECT TO PERFORMANCE REQUIREMENTS ENSURING THAT CONSUMERS WILL HAVE ACCESS TO DTV IN ALL FORMATS

Each local television station will spend eight to ten million dollars transitioning to digital television. The costs are tremendous. Stations will be very reluctant to make this investment, however, if set-top boxes, television sets and other receivers are unable to receive all digital SDTV and HDTV formats. Unless this critical connection is made, there will be no transition to digital television. ALTV believes strongly that the FCC should enact regulations requiring receivers to be able to decode all ATSC DTV formats. Also, performance standards will be necessary to ensure signal quality.⁵⁷

ALTV is not asking the FCC to require certain types of display screens (progressive scan

⁵⁵See Comments of the Digital HDTV Grand Alliance at 20.

⁵⁶*Id* at 20 n.18

⁵⁷See Broadcasters' Comments at 32.

or interlaced). Rather, the FCC should simply insure that whatever display technology is used, the receiver, set-top box or VCR be capable of decoding all ATSC DTV digital formats.⁵⁸

Television set manufacturers argue against imposing this requirement. They contend that market forces alone ensure that receiving equipment would be capable of receiving all digital formats. Nonetheless, Congress found it necessary to give the FCC authority to adopt receiver standards because interference could be reduced most efficiently at the receiving, rather than the transmitting, end. 47 U.S.C. Section 302(a). In enacting Section 302(a) Congress observed that while interference reducing equipment added only a few cents to the cost of a television set, equipment manufacturers would not install these remedies voluntarily.⁵⁹ The same situation could apply to the manufacturing of new digital television sets. The FCC clearly has authority to enact such regulations under this provision of the Act.⁶⁰

IV. CABLE AND OTHER MASS MEDIA DELIVERY SYSTEMS SHOULD BE REQUIRED TO EMPLOY COMPATIBLE TECHNOLOGIES

The rapid deployment of advanced digital free, over-the-air television will depend, in large measure, on its compatibility with cable television. Recognizing this fact, the Advisory Committee included cable throughout the process.

Throughout the nine-year Advisory Committee process, the cable industry has made significant investments and contributions to ensure the suitability of the standard for carriage over cable systems. A significant portion of the Advisory Committee's laboratory and field tests were conducted by Cable Television laboratories, Inc. ("Cable Labs"), including testing of the selected 16-VSB mode.

The testing focused on ensuring that the digital HDTV system developed for

⁵⁸It may not be necessary for all CRT monitors to become subject to these rules. For example, there appears to be no need for security monitors to be capable of receiving all digital ATSC DTV formats. The requirements should apply however, to all receiving equipment being marketed as providing access to broadcast-type video services.

⁵⁹See Communications Amendments Act of 1982, Pub. L. No. 97-259, 96 Stat. 1087, S. Rep. No. 97-191, 97th Cong., 2nd Sess. 7 (1982).

⁶⁰Enacting such regulations is also consistent with the goal of the All Channel Receiver Act, 47 U.S.C. Section 303(s), as well as the closed captioning requirements contained in 47 U.S.C. 303(u).